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ABSTRACT

This presentation attempts to illustrate that mathematics in the elementary grades is not and should not be "culture free." As a prescriptive course, the discussion gives suggestions on how to improve the mathematics experience of elementary school children by using the culture of both the teacher and the learner in mathematics instruction. (Author/MK)

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Teaching Mathematics in a Multicultural Setting: Some Considerations When Teachers and Students are of Differing Cultural Backgrounds.

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This presentation will not deal with: a) specific discipline or behavior problems that may arise in a multicultural/multi-ethnic/bilingual setting - - however, this discussion may have a direct influence on discipline or behavior; b) nor will this presentation identify the differences that may exist between subcultures and ethnic groups when considering mathematics learning.

This presentation will attempt to illustrate that mathematics in the elementary grades is not and should not be "culture free." As a prescriptive course, the discussion will give suggestions on how to improve the mathematics experience of elementary school children by using the culture of both the teacher and the learner in mathematics instruction.

If one were to examine textbooks, psychomotor materials, perceptual materials, audio-visual materials, and other commercially produced materials for the learning of mathematics at the elementary school level, one will see pictures, word problems, etc. that depict a certain occupation, sex, appearance, name, places, events, voice quality, etc. "common" to the majority of Americans. After so much culturally related evidence, can one say the mathematics learning is "culture free?" Hardly. But, the question is whose "culture" is being exemplified?

Banks (1975) discusses culture along a pluralistic--assimilantionistic continuum. Let's look at some assumptions about the aspects of culture and learning.

MATCH THE STATEMENTS BELOW WITH EITHER THE PLURALISTIC, PLURALISTIC--ASSIMILATIONISTIC, OR THE ASSIMILATIONISTIC POINTS OF VIEW:

Statement One: Cultural subgroups have unique cognitive styles.

Statement Two: Cultural subgroups have some unique cognitive styles, but share many learning characteristics with other groups.

Statement Three: Human learning styles and characteristics are universal.

Regarding culture and learning, statement one is the view of the cultural plurlist. Statement two is the point of view of the cultural pluralist--assimilationist. Statement three, then, is the view of the pure cultural assimilationist. (The reader is to assume the pluralist and the assimilationist to be at opposite ends of the acculturating continuum.)

To further establish the link between learning styles and culture, Ramirez and Castaneda report three styles:

"A. Incentive-motivational styles that are short and long term goal oriented.

B. Human relational styles that are concerned with internal and external locus of control.

and C. Patterns of Intellectural abilities and learning styles which deal with mechanisms for collecting, organizing, and using information about the environment (i.e. inductive (deductive)" (Ramirez and Castaneda, 1974)

In the report by Ramirez and Casteneda they further report two identifiable categories into which individuals (and in this case, cultural subgroups) would distinctly fall - - field dependent learners and field independent learners.

"A. Field-dependent children do best on verbal tasks of intelligence test; learn materials more easily which have humor; are sensitive to the opinions of others; perform better when authority figures express confidence in their ability; and, conversely, perform less well when authority figures doubt their ability.

B. Field-independent children do best on analytic tasks; learn material that is inanimate and impersonal more eagerly; and their performance is not greatly affected by the opinions of others." (Ramirez and Castaneda, 1974)

One of the dangers of classifying learners into such learning styles is the tendency to make learning somewhat "half-witted" --especially when one considers the overwhelming evidence that relates the field dependent and field independent behaviors with that of the hemispheric regions of the brain.

Another danger implied from these research findings, is the notion that teaching styles usually fall quite clearly into field-independent and field-dependent behaviors. Clearly, there will be the possibility of half-witted teaching or erratic communication of ideas to be learned.

A listing of learner behaviors paired with teacher behavior is provided for your study.

Field Dependent	Field Independent
Learner Behaviors	
Relationship to peers.	Relationship to peers.
1. Likes to work with others to achieve a common goal.	1. Prefers to work independently.
2. Likes to assist others.	2. Likes to compete and gain individual recognition.
3. Is sensitive to feelings and opinions of others.	3. Task oriented; is inattentive to social environment when working.
Personal Relationship to teacher.	Personal Relationship to teacher.
1. Openly expresses positive feelings for teacher.	1. Rarely seeks physical contact with teacher.
2. Asks questions about teacher's tastes and personal experiences; seeks to become like teacher.	2. Formal interactions with teacher are restricted to tasks at hand.
Instructional Relationship to teacher.	Instructional Relationship to teacher.
1. Seeks guidance and demonstration from teacher.	1. Likes to try new tasks without teacher's help.
2. Seeks rewards which strengthen relationship with teacher.	2. Impatient to begin tasks; likes to finish first.
3. Is highly motivated when working individually with teacher.	3. Seeks nonsocial rewards.
Teacher Behaviors	
Personal behaviors.	Personal behaviors.
1. Displays physical and verbal expressions of approval and warmth.	1. Maintains formal relationship with students.
2. Uses personalized rewards which strengthen the relationship with students.	2. Centers attention on instructional objectives; gives social atmosphere secondary importance.
Instructional behaviors.	Instructional behaviors.
1. Expresses confidence in child's ability to succeed.	1. Encourages independent student achievement.
2. Gives guidance to students; makes purpose and main principles of lesson obvious to students.	2. Encourages competition between students.
3. Encourages learning through modeling; asks children to imitate.	3. Adopts a consultant role.
4. Encourages cooperation and development of group feelings.	4. Encourages trial and error learning.
5. Holds internal class discussions relating concepts to student's experiences.	5. Encourages task orientation.
Curriculum related behaviors.	Curriculum related behaviors.
1. Exphasizes global aspects of concepts; clearly explains performance objectives.	1. Focuses on details of curriculum materials.
2. Personalized curriculum.	2. Focuses on facts and principles; encourages novel approaches to problem-solving.
3. Humanizes curriculum.	3. Relies on graphs, charts and formulas.
4. Uses teaching materials to elicit expression of feelings from students.	4. Emphasizes inductive learning and discovery approaches.

With the foregoing characteristics in mind about learning styles, let's examine some teaching assumptions from a cultural point of view. Choose the one that best represents your point of view.

Statement One: Students need skilled teachers who are very knowledgeable about and sensitive to their ethnic cultures and cognitive styles.

Statement Two: Students need skilled teachers of their same race and ethnicity for role models, to learn more effectively, and to develop more positive self-concepts and identities.

Statement Three: A skilled teacher who is familiar with learning theories and is able to implement those theories effectively is a good teacher for any group of students, regardless of their ethnicity, race, or social class. The goal should be to train good teachers of children.

Statement one, two, and three respectively are the points of view of the cultural pluralist-assimilationist, the cultural pluralist, and the assimilationist.

So far we have looked at learning styles and desired teacher behaviors. Now let's turn to the cultural assumptions that relate to selecting, designing, and the use of mathematics, curricula materials. First from the statements given below, choose the one that best represents your point of view.

Statement One: Use materials and teaching styles which are related to the common-culutre. The curriculum should help the child to develop a commitment to the common civic culture and its idealized ideologies.

Statement Two: Use materials and teaching styles which are culture specific. The goal of the curriculum should be to help the child to function more successfully within his or her own ethnic culture and help to liberate his or her ethnic group from oppression.

Statement Three: The curriculum should respect the ethnicity of the child and make use of it in positive ways. The goal of the curriculum should be to help the child learn how to function effectively within the common culture, his or her ethnic culture, and other ethnic cultures.

Statements one, two, and three respectively are the points of view of the cultural assimilationist, the cultural pluralist, and the cultural pluralist-assimilationist.

In order to enrich the mathematics curriculum with the culture of the learner, it was the intent of this paper to argue for the cultural pluralist-assimilationist point of view. Consequently, it is imperative to draw examples and procedures from both the "common" culture of the United States as well as from the "local" culture from which the learner comes. The development and reinforcing of understanding of mathematics concepts should utilize the notion of "social exchange" and not social power to lead to productivity within the classroom. (Larkin, 1975)

The use of instructional materials in the teaching of mathematics should follow this paradigm:

1. Concrete and semiconcrete materials: Use materials that are from the common culture plus those specific to the learners in the class.

2. Abstract materials: Encourage learners to interpret abstraction in the form of story situations they contrive.

3. Applications: Use occupations, foods, places, and events that are in the learners environment.

4. Drill and Practice: Since much time is spent here, use a variety of social and cultural exchanges wherever possible.

Some sample activities on which you might build are:

Objective: Match numerals 1 through 10 with sets of objects.

Materials: Posterboard, stickers or small pictures, felt pen, clothespin.

Procedure: Ask the learner to count the pictures in one set on the posterboard and attach the corresponding numeral which will be on the clothespin to that set.

Given the numeral, ask the learner to find the corresponding set.

Culture Specific: Use pictures for sets that relate to a particular cultures, or to a holiday.

Objective: Addition or subtraction with single digit numbers.

Materials: Baking pan, cardboard, marker.

Procedure: Draw and cut out 10 figures in pan. Learner can add or subtract the number in and/or out of the pan.

Culture Specific: The figures could represent tortillas, hotcakes, cornbread, etc.

Objective Materials: Reinforcing basic operations (facts), Glue, sturdy paper or board (2 pieces), a picture.

Procedure: Glue the picture on one piece of paper or board. Cut the picture into puzzle like parts and write problems on each puzzle part. Write the answers on the second piece of paper or board as they would appear or as they should appear when the puzzle is worked out.

Culture Specific: Use a picture appropriate to the child's culture.

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